

Combined Submental-tongue Flap for Reconstruction of Subtotal Traumatic Avulsion of Lower Lip: A Technical Note

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Summary: Delayed reconstruction of large lower lip defects after traumatic avulsion is a challenge in medically compromised patients with concomitant cheek skin burn. Combination of orthograde submental transposition flap and anteriorly based ventral rectangular myomucosal tongue flap is useful. The former reconstructs the body of the defect, and the latter masks the red lip, resembling vermilion. In this article, the detailed surgical technique is explained. Literature review of tongue flap and submental flap in the lower lip reconstruction is presented. (*Plast Reconstr Surg Glob Open* 2015;3:e302; doi: 10.1097/GOX.0000000000000273; Published online 2 February 2015.)

Lip reconstruction is an interesting topic for surgeons. The lips might be affected by pathologic lesions, trauma, human and animal bites, occupational accidents, noma, electric burns, congenital deformities such as whistle deformity in the upper lip cleft and Van der Woude syndrome with deep lower labial pits, and facial deformities such as hemifacial atrophy and Möbius syndrome.¹⁻¹⁰

There are many methods for reconstruction of this important structure, but selection of an appropriate technique is case dependent. In this article, a surgical technique is presented that used combined orthograde submental flap and tongue flap for reconstruction of submental traumatic avulsion of lateral lower lip.

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PATIENT AND SURGICAL TECHNIQUE

Patient

The patient was a 67-year-old man with diabetes who had experienced subtotal traumatic avulsion of the chin concomitant with right lower lip segment in an occupational accident during an explosion in the work environment.^{11,12} The vermilion defect extended from the right commissure and passed the midline. The wedge-shaped defect encroached on the chin, extending inferiorly to the upper neck. The mandibular bone was exposed in the parasymphiseal region (Fig. 1). The cheek skin was deeply burned, and the lower eyelid was also severely injured.

He was referred to the authors for reconstruction 14 days after the initial injury.

Surgical Technique

The surgical operation was performed under general anesthesia. The facial artery and vein were identified; then a submental island flap was elevated while the lateral edge of the flap was coincident with the wound edge and the skin paddle was designed medial to the laceration (Fig. 2). With the

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Fig. 1. Wedge-shaped lateral lower lip defect, involving the right commissure and extending medially, 1 cm past the midline. Inferiorly, it extends into the neck and the mandibular bone is exposed.



Fig. 2. Transpositioned submental flap.

pinch test, the width of the flap was determined, and the flap was elevated from the opposite side toward the pedicle. In the nonpedicled half, the flap comprised skin, subcutaneous mucosa, and platysma muscle. On the pedicled side, the flap contained the anterior belly of the digastric and mylohyoid muscles.

The myocutaneous orthograde submental flap was transposed to cover the exposed mandibular bone after decortication of the necrotic bone with a round surgical bur to reach the bleeding points and replace the missing soft tissue. The donor site was closed primarily.

The submental flap reconstructed the bulk of the defect, and anteriorly based ventral rectangular tongue flap was used to reconstruct the red lip. The flap pedicle was divided 2 weeks later, and the patient continued oral intake of food with a soft/liquid diet 24 hours after the operation (Fig. 3).

DISCUSSION

Lower lip reconstruction that involves more than two thirds of the lip needs local/regional flaps.¹³ Replacement of both the bulk of the lower lip and the vermilion border needs special attention to the available adjacent tissues.

Webster-Bernard flap, nasolabial flap, Gillies fan flap, and bilateral Karapandzic flap need intact skin in the cheek and/or perioral region for lip reconstruction.¹⁴⁻¹⁷

Flaps that can reconstruct the vermilion come from advancing the remaining vermilion, buccinator-based myomucosal flap nourished by the facial artery myomucosal flap, buccal mucosal transposition, and the tongue flap.¹⁸⁻²¹ Among them, the remaining vermilion in the case presented was very limited, and flaps containing buccal mucosa were not recommended to preserve perforating branches from facial artery to overlying skin, so that nourishment of the burned skin of the face would not be compromised.

The tongue flap remains the only choice in such cases and can provide both the bulk and the color for the reconstruction of the lower lip.

The tongue flap for reconstruction of the lower lip was introduced in 1964 by 2 researchers who worked separately from each other: Bakamjian²² and Macgregor.²³

For reconstruction of the lip, it is used as an anteriorly based lateral tongue flap (marginal tongue flap),²² a bipedicled tongue tip, a bilateral dorsal tongue, a bifid tongue flap, and an anteriorly based dorsal tongue flap.²⁴⁻²⁷ The simplest and the most commonly used form for this purpose is the ventral myomucosal tongue flap. This flap avoids the dorsal tongue papilla and gives the lip a shiny red appearance.^{28,29}

Regional flaps suitable for skin replacement in this special situation (with deep cheek burn) are cervical flaps.³⁰ Superiorly based platysma flap, infrahyoid myomucosal island flap, and submental flap are regional cervical flaps that are reported for reconstruction of



Fig. 3. A, Photograph immediately after the operation. B, Photograph taken 3 months after operation.

the lower lip.^{31–33} In this case, 3 factors prompted us to choose a submental flap: first, proximity to the defect; second, the hair pattern similar to the adjacent lip skin; and third, the greater experience of the authors with this flap.

The submental flap was introduced by Martin et al³⁴ in 1993, who used it for facial reconstruction in 8 patients, one of whom was a 66-year-old female patient with the inferior lip bitten by a dog.

After that, it has sporadically been reported in the literature for reconstruction of the lower lip.^{35–42}

The result of the PubMed search for articles in English for lower lip reconstruction with the submental flap is shown in Table 1.

Both the flaps (submental and tongue) have excellent blood supply and are suitable for the special case that cannot lie down on the bed (adjacent contaminated lip tissue and decorticated underlying mandibular bone) in a patient with diabetes. The submental flap has an axial-pattern blood supply based on facial artery, and the ventral tongue flap is random in pattern but rich in blood supply. The combined submental-tongue flap was ideal in this case. The submental flap reconstructed the body of the defect with a similar tissue in texture and color and contained beard hair while the tongue flap

simulated the red vermilion. Microstomia was not a concern after reconstruction with this method.

Limitations of this kind of reconstruction include the following: first, it is not a functional reconstruction and the sphincter function of the lower lip does not return; second, it is not an innervated flap (motor and sensory).

Distant pedicled flaps, such as deltopectoral and pectoralis major, were recommended during the last century for lip reconstruction, but they had the problems of heavy bulk and unsightly patchy appearance on the face.^{43,44} Nowadays, such applications for these flaps are limited. Free flap transfer is an ideal option for total lower lip reconstruction,⁴⁵ but with poor color match, especially in male patients who need hair-bearing skin on the chin and the lower lip skin.⁴⁶ Free tissue transfer can provide extensive amounts of skin and soft tissue, but it provides very poor esthetic and functional results. Critical structures such as lips should be reconstructed by local flaps if at all possible.⁴⁷

CONCLUSION

A combination of submental-tongue flap is appropriate for reconstruction of lateral lower lip defects extending to the chin.

Table 1. Review of the Literature for Submental Flap Application in Lower Lip Reconstruction

Author	Year	The Presented Work
Martin et al ³⁴	1993	One case of lower lip reconstruction in dog bite injury
Koshima et al ³⁸	2000	Two cases of oral commissure SCC. Combined use of submental flap with toe web
Sebastian et al ³⁵	2008	One case of lower lip and adjacent lower alveolus affected by SCC
Amin et al ³⁹	2011	Two cases of lower lip SCC
Sun et al ³⁶	2013	One case of MEC affecting the commissure of the lips
Ayhan et al ³⁷	2013	Five patients with lower labial SCC
Liu et al ⁴⁰	2013	Three patients with lower labial SCC
Jeong and Lee ⁴¹	2013	For reconstruction of oral commissure, including buccal cheek in 5 cases
Martin et al ⁴²	2013	Delayed reconstruction of both lips injured in a sever mutilation

MEC, mucoepidermoid carcinoma; SCC, squamous cell carcinoma.

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